

WE CLAIM:

1. An Al-Mg alloy wherein upon being subjected to a sensitization treatment a quaternary tau phase is formed at grain boundaries.
2. An Al-Mg alloy according to claim 1, wherein said sensitization treatment is conducted between 80-200 degrees C.
3. An Al-Mg alloy according to claim 1, comprising from 0.05-0.2% Cu.
4. An Al-Mg alloy comprising:
 - Cu 0.05-0.2%;
 - Zn 0.3-0.6%;
 - Mg 4.0-5.0%;
 - Mn 0.4-1.0%;
 - Incidental impurities; and
 - Al balance.
5. An Al-Mg alloy according to claim 4, further comprising Ag 0.03-.23%.
6. An Al-Mg alloy according to claim 4, further comprising Cr 0-0.3%.
7. An Al-Mg-alloy comprising:
 - Cu 0.05-0.2%;
 - Zn 0.3-0.6%;
 - Mg 3.5-5.0%;
 - Mn 0.4-1.0%;
 - Incidental impurities; and
 - Al balance,

wherein upon being subjected to a sensitization treatment a quaternary Al-Mg-Zn-Cu phase is formed at grain boundaries.

8. An Al-Mg alloy according to claim 7, wherein said sensitization treatment is conducted between 80 and 200 °C.

9. An Al-Mg alloy consisting essentially of:

Cu 0.05-0.2%;
Zn 0.3-0.6%;
Mg 4.0-5.0%;
Mn 0.4-1.0%;
Ag 0.03-0.23%;
Incidental impurities; and
Al balance.

10. An Al-Mg alloy consisting essentially of:

Cu 0.05-0.2%;
Zn 0.3-0.6%;
Mg 4.0-5.0%;
Mn 0.4-1.0%;
Incidental impurities; and
Al balance.

11. An Al-Mg alloy consisting essentially of:

Cu 0.05-0.2%;
Zn 0.3-0.6%;
Mg 4.0-5.0%;
Mn 0.4-1.0%;

Cr 0-0.3%;
Incidental impurities; and
Al balance.

12. An Al-Mg alloy comprising:

Cu 0.05-0.2%;
Zn 0.3-0.6%;
Mg 3.9-5.0%;
Mn 0.4-1.0%;
Incidental impurities; and
Al balance.

13. An Al-Mg alloy comprising:

Cu 0.05-0.2%;
Zn 0.3-0.6%;
Mg 3.8-5.0%;
Mn 0.4-1.0%;
Cr 0-0.3%;
Incidental impurities; and
Al balance.

14. An Al-Mg alloy comprising:

Cu 0.05-0.2%;
Zn 0.3-0.6%;
Mg 3.5-6.5%;
Mn 0.4-1.0%;
Cr 0-0.3%;

Incidental impurities; and
Al balance.

15. A marine product, railcar product, dump body, chemical tank cars, cryogenic application and/or auto body panel comprising an Al-Mg alloy according to claim 1.

16. A marine product, railcar product, dump body, chemical tank cars, cryogenic application and/or auto body panel comprising an Al-Mg alloy according to claim 4.

17. An Al-Mg based alloy having weldability, formability, corrosion resistance, and cost processing at a sheet or plate supplier approximating 5XXX alloys and further displaying a substantially reduced propensity to become corrosion-sensitive, even after being subjected to at least one sensitization treatment.

18. An Al-Mg alloy according to claim 17, wherein said sensitization treatment is conducted between 80-200 degrees C.

19. An Al-Mg alloy according to claim 17, comprising from 0.05-0.2% Cu.

20. An Al-Mg alloy according to claim 17 comprising:

Cu 0.05-0.2%;

Zn 0.3-0.6%;

Mg 4.0-5.0%;

Mn 0.4-1.0%;

Incidental impurities; and

Al balance.

21. A marine product, railcar product, dump body, chemical tank cars, cryogenic application and/or auto body panel comprising an Al-Mg alloy according to claim 6.

22. A marine product, railcar product, dump body, chemical tank cars, cryogenic application and/or auto body panel comprising an Al-Mg alloy according to claim 7.
23. A marine product, railcar product, dump body, chemical tank cars, cryogenic application and/or auto body panel comprising an Al-Mg alloy according to claim 8.
24. A marine product, railcar product, dump body, chemical tank cars, cryogenic application and/or auto body panel comprising an Al-Mg alloy according to claim 9.
25. A marine product, railcar product, dump body, chemical tank cars, cryogenic application and/or auto body panel comprising an Al-Mg alloy according to claim 10.
26. A marine product, railcar product, dump body, chemical tank cars, cryogenic application and/or auto body panel comprising an Al-Mg alloy according to claim 11.
27. A marine product, railcar product, dump body, chemical tank cars, cryogenic application and/or auto body panel comprising an Al-Mg alloy according to claim 12.
28. A marine product, railcar product, dump body, chemical tank cars, cryogenic application and/or auto body panel comprising an Al-Mg alloy according to claim 13.
29. A marine product, railcar product, dump body, chemical tank cars, cryogenic application and/or auto body panel comprising an Al-Mg alloy according to claim 14.
30. A marine product, railcar product, dump body, chemical tank cars, cryogenic application and/or auto body panel comprising an Al-Mg alloy according to claim 17.
31. A marine product, railcar product, dump body, chemical tank cars, cryogenic application and/or auto body panel comprising an Al-Mg alloy according to claim 18.
32. A marine product, railcar product, dump body, chemical tank cars, cryogenic application and/or auto body panel comprising an Al-Mg alloy according to claim 19.

33. An Al-Mg alloy according to claim 1, wherein the tau phase formed has an average size from about 0.1 to about 1 μm and a mass loss according to ASTM G 67 of less than about 40 mg/cm^2 .
34. An alloy according to claim 33, wherein said mass loss is less than about 27 mg/cm .
35. An Al-Mg alloy after having been subjected to treatment at temperature of about 80-200 degrees C for sufficient time to establish a drop in ductility to failure from dry air to aqueous NaCl of less than about 10%.
36. An alloy according to claim 1, wherein said sensitization treatment comprises a simulation of actual conditions in use.
37. An alloy according to claim 1, wherein said sensitization treatment occurs during use.
38. An Al-Mg alloy according to claim 7, comprising a tau phase having an average size from about 0.1 to about 1 μm and a mass loss according to ASTM G 67 of less than about 40 mg/cm^2 .
39. An Al-Mg alloy according to claim 38, wherein said mass loss is less than about 27 mg/cm^2 .